

*The School Diversion and Environmental
Education Law*



*Sample Campus Needs
Assessment*

September 2005

Produced under contract by

The Acorn Group



STATE OF CALIFORNIA

Arnold Schwarzenegger
Governor

Alan C. Lloyd, Ph.D.
Secretary, California Environmental Protection Agency

•

INTEGRATED WASTE MANAGEMENT BOARD

Rosario Marin
Board Chair

Rosalie Mulé
Board Member

Cheryl Peace
Board Member

Carl Washington
Board Member

(Vacant Position)
Board Member

(Vacant Position)
Board Member


•

Mark Leary
Executive Director

For additional copies of this publication, contact:

Integrated Waste Management Board
Public Affairs Office, Publications Clearinghouse (MS-6)
1001 I Street
P.O. Box 4025
Sacramento, CA 95812-4025
www.ciwmb.ca.gov/Publications/
1-800-CA-WASTE (California only) or (916) 341-6306

Publication #560-05-008

 Copies of this document originally provided by CIWMB were printed on recycled paper containing 100 percent postconsumer fiber.

Copyright © 2005 by the California Integrated Waste Management Board. All rights reserved. This publication, or parts thereof, may not be reproduced in any form without permission.

Prepared as part of contract nos. SCS-C110 and IWM03052 (total contract amount: \$621,000, includes other services not related to this report).

The California Integrated Waste Management Board (CIWMB) does not discriminate on the basis of disability in access to its programs. CIWMB publications are available in accessible formats upon request by calling the Public Affairs Office at (916) 341-6300. Persons with hearing impairments can reach the CIWMB through the California Relay Service, 1-800-735-2929.

Join Governor Schwarzenegger to Keep California Rolling.

Every Californian can help to reduce energy and fuel consumption. For a list of simple ways you can reduce demand and cut your energy and fuel costs, Flex Your Power and visit www.fypower.com.

Disclaimer: This publication was produced under contract with The Acorn Group. Statements and conclusions contained in this publication are those of the contractor and not necessarily those of the California Integrated Waste Management Board, its employees, or the State of California and should not be cited or quoted as official Board policy or direction.

The State makes no warranty, expressed or implied, and assumes no liability for the information contained in the succeeding text. Any mention of commercial products or processes shall not be construed as an endorsement of such products or processes.

Table of Contents

| | |
|--|----|
| Acknowledgments..... | ii |
| Project Director | ii |
| Writing Team | ii |
| Introduction..... | 1 |
| Project Background | 1 |
| Overview of the Campus Needs Assessment | 1 |
| Purpose of the Sample Campus Needs Assessment | 2 |
| Campus Needs Assessment: The School Campus—A Context for Learning..... | 3 |
| Create a School Campus Map | 3 |
| Natural and Social Systems on the School Campus | 4 |
| Relationships Between Natural and Social Systems on the School Campus | 6 |
| Guiding and Supporting Questions for the Campus Needs Assessment | 6 |
| Curriculum Map—Standards-Based Connections Set | 8 |
| Standards-Based Connections Set and Learning Objectives for the Campus Needs Assessment | 9 |
| Lesson Planning for the Campus Needs Assessment | 10 |
| Identify the Strategies and Considerations for Implementing the Campus Needs Assessment | 14 |

Acknowledgments

State Board of Education

California Department of Education

State Secretary for Education

Project Director

Tricia Broddrick (Sept. 2001–March 2004)
Office of Education and the Environment
California Integrated Waste Management Board

Joanne Vorhies (April 2004–present)
Office of Education and the Environment
California Integrated Waste Management Board

Writing Team

Jayne C. Henn
State Education and Environment Roundtable

Grace M. Lieberman
State Education and Environment Roundtable

Linda L. Hoody
State Education and Environment Roundtable

Gerald A. Lieberman, Ph.D.
Director
State Education and Environment Roundtable

Jennifer Rigby
Director
The Acorn Group

Introduction

Project Background

The School Diversion and Environmental Education Law (School DEEL) was signed into law in September 2001 (SB 373, Torlakson, Chapter 926, Statutes of 2001). The law created a series of integrated waste management and education mandates for the California Integrated Waste Management Board (CIWMB). The legislation is intended to increase the presence of resource management programs, such as waste reduction, recycling, and composting on school district campuses statewide.

The School DEEL calls for developing, implementing, and adopting a plan for elementary and secondary schools in the state that includes the following elements:

- Coordinate instructional resources and strategies for providing active pupil participation with on-site conservation efforts.
- Promote service-learning opportunities between schools and local communities.
- Assess the impact to participating pupils on student achievement and resource conservation.
- Create models and school waste reduction tools for schools, school districts, county offices, and local agencies.
- Establish an Environmental Ambassador Pilot Program and a unified education strategy (UES).
- Provide grants to school districts to implement programs teaching source reduction, recycling, and composting.
- Identify and promote use of recycled-content materials and environmentally preferable products in the construction and modernization of public school facilities.
- Evaluate the effects of school waste reduction plans and other resource conservation efforts in the state's schools.

The School DEEL specifies that “Every school district and school site in this state will be encouraged to implement source reduction, recycling, and composting programs that ... (A) Reduce waste and conserve resources. (B) Provide pupils with a ‘hands-on’ learning experience.” (Public Resources Code section 42630) The legislation calls for the development of “service-learning partnerships, in which schools and communities work to provide real world experiences to pupils in areas of the environment and resource conservation, including education projects developed and implemented by pupils to encourage others to utilize integrated waste management concepts.” (Education Code section 51226.4)

Overview of the Campus Needs Assessment

As part of the School DEEL program, eight school districts participated in the CIWMB's Unified Education Strategy Grant Program. These eight districts were required to implement a campus needs assessment (CNA)—a standards-based instructional plan to assess the current campus waste management practices and related resource use. The waste auditing process, conducted as part of the campus needs assessment, provided opportunities for students to: collect data

regarding their school's waste generation, analyze data collected during the auditing process, and evaluate results to formulate plans for service projects.

In addition to the valuable educational experiences students gained through the auditing process, districts also benefited from the partnerships formed with local agencies and community groups. These partners offered expertise, provided needed materials and supplies, assisted the schools during the administration of their CNAs, and served as audiences for proposed solutions to issues identified through the campus needs assessment.

In addition to the *Sample Campus Needs Assessment*, CIWMB has available its *Sample Campus Environmental Audit*. This tool details recommended auditing procedures for students and is available at: www.ciwmb.ca.gov/Schools/.

Purpose of the Sample Campus Needs Assessment

The *Sample Campus Needs Assessment* is intended to serve as a guide to teachers and schools that want to create and implement an instructional unit that merges environmental service-learning with academic study. Specifically, it is designed to help students work toward mastery of sixth-grade standards, explore their community's use of natural resources, and better understand California's Environmental Principles and Concepts, a component of the Education and the Environment Initiative (AB1548, Pavley, Chapter 665, Statutes of 2003).

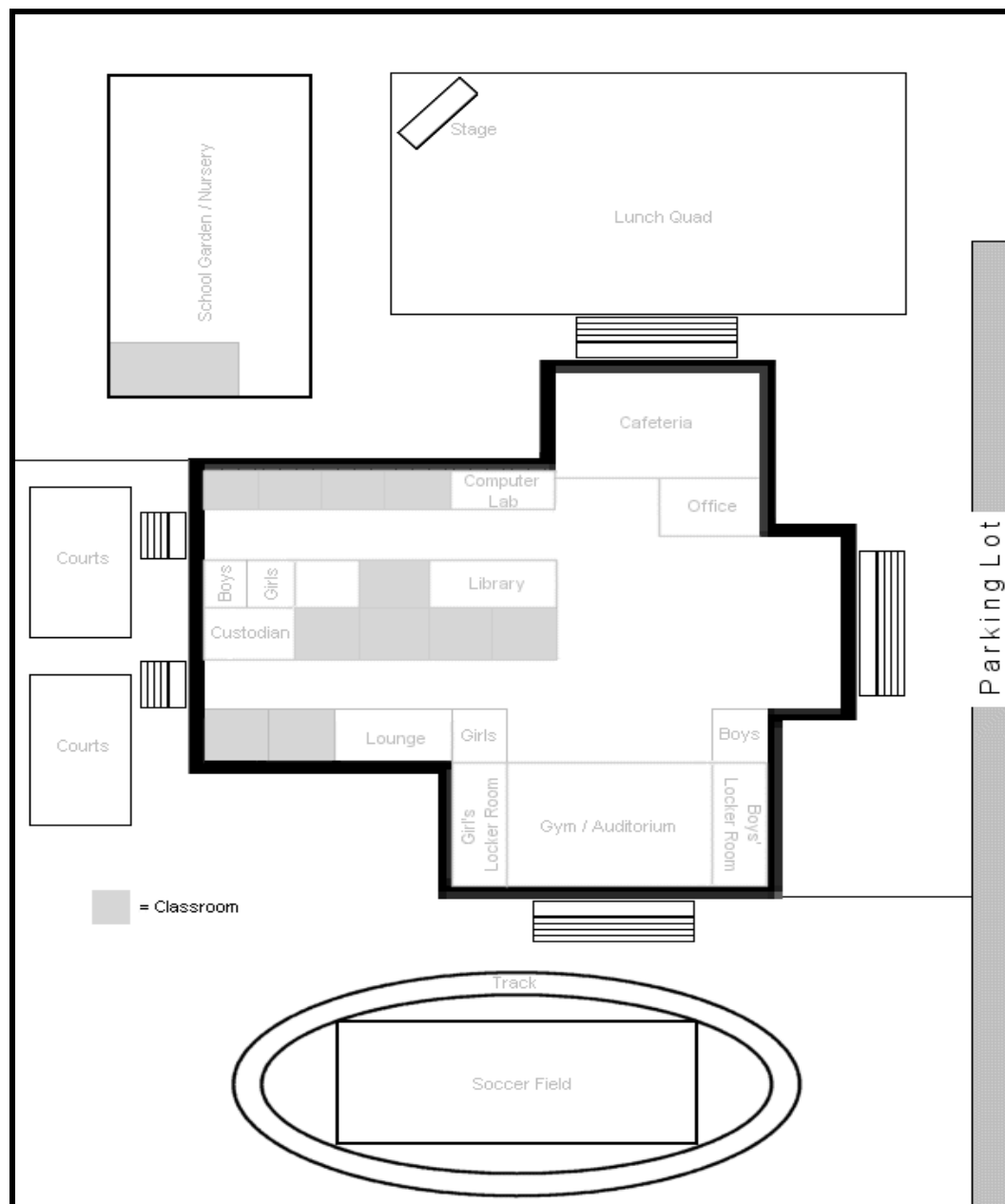
The needs assessment is designed for use at the beginning of the school year. Once completed, and after students develop a foundational level of knowledge, the students will be better equipped to comprehend resource and energy use as presented in the sixth-grade content standards in science and history-social science. Such use of resources can be examined in ancient civilizations as well as present-day societies. Regardless of time in history, human societies have always depended upon natural systems for their survival. Having students recognize this relationship is a key component of the Education and the Environment Initiative. Further, it is an effective strategy for making learning more relevant to their lives.

Campus Needs Assessment: The School Campus—A Context for Learning

Create a School Campus Map

Map your school campus. Include: buildings, outdoor gathering areas, natural areas, parking lots and driveways, sports fields and facilities, and locations where waste is produced, stored or handled, etc.

School Campus Map



Natural and Social Systems on the School Campus

Explore the concept of systems thinking and be able to explain natural and social systems and their components, processes, and interactions. Identify natural systems and social systems that are found on the school campus.

| Natural Systems | Social Systems |
|--|--|
| Students, teachers, administrators, and other staff who use and work at the school site. Garden and nursery. Soccer field. Landscaped areas. Habitat that covered the land prior to the construction of the school facilities. | Food services: cafeteria, lunch quad and food services personnel. Building systems: classrooms, computer lab, library, multipurpose room, and track. Facility services: custodians, purchasing department. |

Choose one or more interactions that may occur between these systems, then:

- Identify and describe each interaction.
- Specify the components and processes of the natural and social systems that seem to be involved in these interactions.
- List the potential effects on the school and community that may result from these significant systems interactions, their possible causes, and who or what may be affected.

Below is further information on the above bulleted items.

1. Interaction description

The social systems that support the students, teachers, administrators, and other staff who use and work at the school consume a variety of resources, including paper, agricultural products, energy, water, mineral resources, and the habitat that covered the land prior to the construction of the school facilities. Waste is produced as resources are supplied and consumed in the course of a normal school day. The school's waste management system affects the natural areas of campus (litter, loss of open space), as well as has an impact on the finances of the school and school district. Waste can also take the form of heat (from heating and air conditioning systems) and water run-off. Consequently, the waste created by the school site also interacts with the larger community. As demand for natural resources increases and by-products from resource use are produced, the health of natural systems is often compromised. Resource consumption by people at the school site requires resources from natural systems in the larger environment.

2. Components and processes involved in the interaction

| Components and Processes: Natural Systems | Components and Processes: Social Systems |
|--|--|
| People who use and work at the school site. Air, water, soil, land, plants, animals and energy (natural resources). Energy flow, decomposition, photosynthesis, respiration. | Buildings, manufactured products, tools and equipment. Consumption patterns, purchasing. Processes, waste management, education, landscaping, school policies. |

3. Potential effects of the interaction on the school or community

Land-use patterns on campus, changes in the aesthetic character of the campus, costs of operating the school, availability of resources, energy consumption, and the school's waste management practices.

4. Possible causes of the interaction

- a. Educational processes and procedures require that resources be consumed at the school sites.
- b. Facilities management processes and procedures require that resources be consumed at the school site.
- c. Lack of analysis and understanding of the relationships between resource consumption and the generation and disposal of waste.

5. Who or what seems to be affected by the interaction

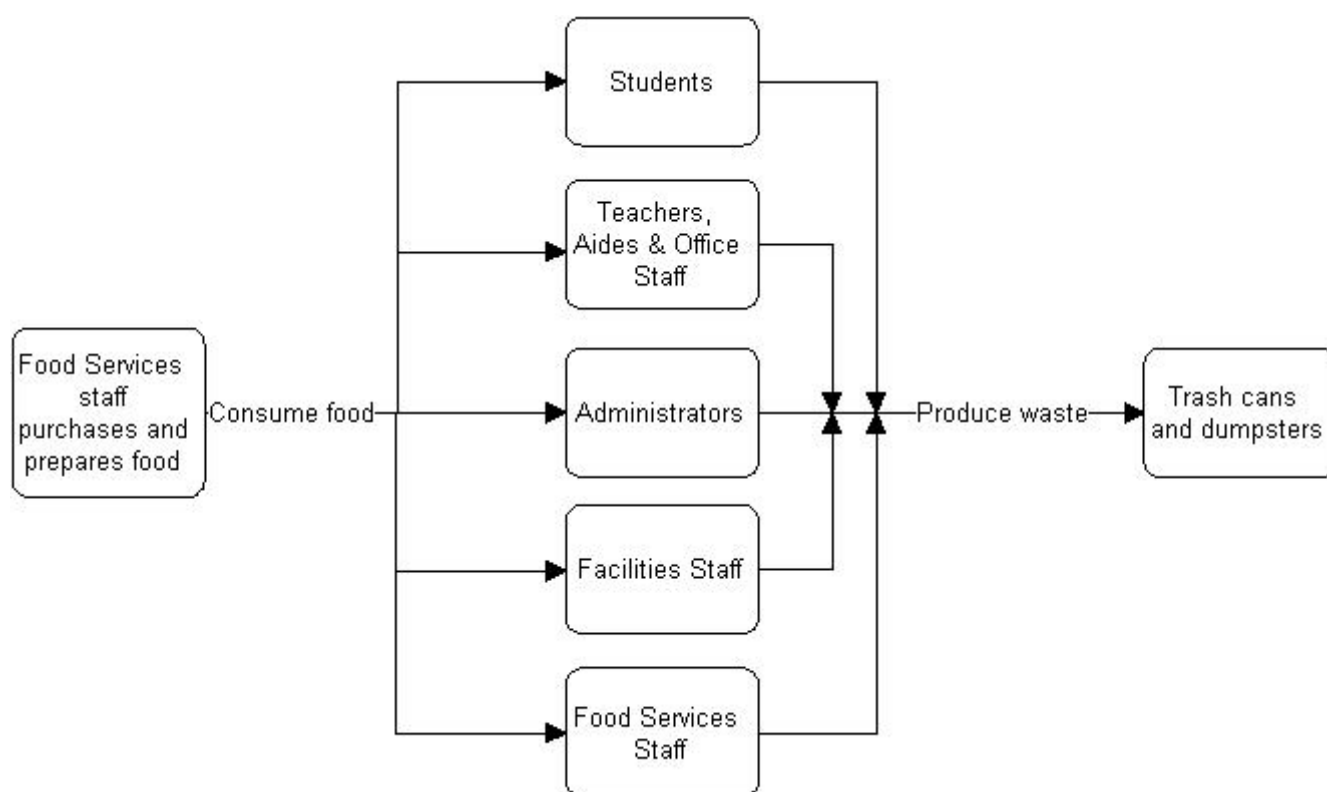
School system: Increased costs regarding supplies and materials, maintenance and cafeteria staff, and energy.

Campus: Soil contamination and increased pests and litter on campus grounds.

People: Decreased availability of funds to purchase instructional materials and programs and aesthetic character of campus.

Relationships Between Natural and Social Systems on the School Campus

Use the space below to chart some of the relationships among the various components of selected systems.



Guiding and Supporting Questions for the Campus Needs Assessment

Develop supporting questions that (1) students might ask as they investigate one or more guiding questions (see examples below) and (2) that can be used as a means of addressing and interconnecting standards-based knowledge and skills from various disciplines.

(Supporting questions divide the guiding question into elements that are relevant, answerable, and manageable for individual students and cooperative learning groups. Teachers help students address content standards from multiple disciplines as students study and seek answers to their supporting questions.)

Sample Guiding Questions:

How do the patterns of resource use on our campus help us understand the influence of demand for natural resources on ancient civilizations?

How does our school's current resource use compare with the practices of ancient civilizations?

Write up to five or more supporting questions that students might develop to address the guiding question(s). Below are five examples of supporting questions.

Supporting Question 1: What are resources?

Supporting Question 2: What resources are used on our campus and where are they stored?

Supporting Question 3: How efficiently do we use resources on our campus?

Supporting Question 4: Once resources are used on campus, where do by-products such as solid waste, water, and heat exhaust go?

Supporting Question 5: What are some of the results of inefficient use of resources?

Curriculum Map—Standards-Based Connections Set

Write the academic content standards that you select as the focus for your campus needs assessment.

Sample Academic Content Standards: Grade level: 6th grade

English-Language Arts

Reading 2.4: Clarify an understanding of texts by creating outlines, logical notes, summaries, or reports.

Speaking 2.2: Deliver informative presentations: a. Pose relevant questions sufficiently limited in scope to be completely and thoroughly answered. b. Develop the topic with facts, details, examples, and explanations from multiple authoritative sources (e.g., speakers, periodicals, online information).

Mathematics

Statistics, Data and Probability 1.1: Compute the range, mean, median, and mode of data sets.

Science

Resources 6b: Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. Based on this understanding, students will know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.

Resources 6c: Students know the natural origin of the materials used to make common objects.

History-Social Science

Chronological and Spatial Thinking 3: Students use a variety of maps and documents to identify physical and cultural features of neighborhoods, cities, states, and countries and to explain the historical migration of people, expansion and disintegration of empires, and the growth of economic systems.

Standards-Based Connections Set and Learning Objectives for the Campus Needs Assessment

Develop a standards-based connections set that aligns with the campus needs assessment. Write learning objectives to achieve each standard in the standards-based connections set. Samples are below.

English-Language Arts

Reading 2.4: Clarify an understanding of texts by creating outlines, logical notes, summaries, or reports.

Learning Objective(s)

- Take notes, create outlines, and write summaries of written materials on the topics of resource use and waste management.

Speaking 2.2: Deliver informative presentations.

Learning Objective(s)

- Prepare and deliver informative presentations on resource use and waste management on the school campus.

Mathematics

Statistics, Data and Probability 1.1: Compute the range, mean, median, and mode of data sets.

Learning Objective(s)

- Compute the range, mean, median, and mode of data gathered during a campus waste audit.

Science

Resources 6b: Sources of energy and materials differ in amounts, distribution, usefulness, and, the time required for their formation. Based on this understanding, students will know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.

Learning Objective(s)

- Identify energy and material resources that are essential to human life.
- Explain that renewable resources are replaced over a relatively short time period, nonrenewable resources accumulate over such a long time that they are considered fixed, and inexhaustible resources have no practical limits.
- Classify energy and material resources as renewable, non-renewable, or inexhaustible.
- Identify different energy and material resources that are provided by natural systems.
- Provide examples of how human practices and rates of consumption can affect the availability of energy and material resources that are essential to human life.

Resources 6c: Students know the natural origin of the materials used to make common objects.

Learning Objective(s)

- Identify the natural origin of the materials used to make common objects.

History-Social Science

Chronological and Spatial Thinking 3: Students use a variety of maps and documents to identify physical and cultural features of neighborhoods, cities, states, and countries and to explain the historical migration of people, expansion and disintegration of empires, and the growth of economic systems.

Learning Objective(s)

- Use a variety of maps and documents to identify physical and cultural features of the school campus.

Lesson Planning for the Campus Needs Assessment

Develop specific standards-based lessons for the campus needs assessment. Identify the instructional materials that will be used to support the lessons.

Pre-Assessment Strategy

- Students will take a mathematics quiz provided in their textbook in which they calculate the mean and identify the median and mode of data sets.
- Students will take a science quiz provided in their textbook or created by the teacher in which they identify natural resources and classify various resource materials as renewable, non-renewable, or inexhaustible.

Remediation Strategy for Any Prerequisite Knowledge and Skills

Review with students how to read maps and identify items on maps; how to understand scale, and also assure students are able to make drawings to scale; how to understand and work with fractional relationships and calculate percentages; how to use and apply appropriate measurement skills, and also assure that students are able to convert units of measurement.

LESSON 1—Identifying Resources

Standards-Based Learning Objective(s)

Students will:

- Take notes, create outlines, and write summaries of written materials on the topics of resource use and waste management. (Reading 2.4).
- Identify energy and material resources that are essential to human life (Resources 6b).
- Explain that renewable resources are replaced over a relatively short time period; nonrenewable resources accumulate over such a long time period that they are considered “fixed”; and inexhaustible resources have no practical limits (Resources 6b).

- Classify energy and material resources as renewable, non-renewable, or inexhaustible (Resources 6b).
- Identify different energy and material resources that are provided by natural systems (Resources 6b).
- Identify the natural origin of the materials used to make common objects (Resources 6c).

Adopted Instructional Materials and Other Resources: Science textbooks and *School DEEL Resource Manual* (CIWMB publication #560-05-010), access to computer lab for conducting research.

Summary Description

- Students read and take notes on sections in their science textbook that relate to energy and material resources.
- Teacher facilitates a class discussion to identify and list energy and material resources that are essential to human life.
- Using this class-generated list, students define the term “resource” and identify which resources are renewable or non-renewable or inexhaustible.
- Students conduct research to identify the natural materials used to make common classroom and school products/objects, and determine whether they are made using renewable or non-renewable resources.

Responsible individual(s): Classroom teacher, computer lab teacher.

Timeline: Three class period(s) and two homework sessions.

LESSON 2—Determining Resource Use on Campus

Standards-Based Learning Objective(s)

Students will:

- Use a variety of maps and documents to identify physical and cultural features of the school campus (Chronological and Spatial Thinking 3).
- Identify different energy and material resources that are provided by natural systems (Resources 6b).
- Classify energy and material resources as renewable, non-renewable, or inexhaustible (Resources 6b).
- Identify energy and material resources that are essential to human life (Resources 6b).
- Provide examples of how human practices and rates of consumption can affect the availability of energy and material resources that are essential to human life (Resources 6b).
- Identify the natural origin of the materials used to make common objects (Resources 6c).

Adopted Instructional Materials and Other Resources: Physical or geological maps or architectural site plans of the campus and local community.

Summary Description

- Students examine a variety of maps of their community, including the campus and surrounding neighborhood.
- Students work in small teams to create a map to the scale of their school campus that includes buildings, natural areas, playing fields, commons, and parking areas.
- The teacher works with students to create a concept map illustrating how supplies and materials are obtained, stored, and handled on campus.
- Students use this information to locate and label areas on their maps of the campus where resources are stored.
- Students create concept maps (flowcharts) demonstrating their knowledge of where certain school supplies come from (natural resource origins), how they get to the school, and where they are used, and predict what happens to them when they are “used up.”

Responsible Individual(s): Classroom teachers, custodian or facilities manager(s), principals, office and food service staff, parent volunteers.

Timeline: Five class periods and follow-up homework sessions as needed.

LESSON 3—Conducting a Campus Waste Audit

Standards-Based Learning Objective(s)

Students will:

Compute the range, mean, median, and mode of data gathered during the campus waste audit (Statistics, Data and Probability 1.1).

- Identify different energy and material resources that are provided by natural systems (Resources 6b).
- Classify energy and material resources as renewable, non-renewable or inexhaustible (Resources 6b).
- Identify energy and material resources that are essential to human life (Resources 6b).
- Provide examples of how human practices and rates of consumption can affect the availability of energy and material resources that are essential to human life (Resources 6b).
- Identify the natural origin of the materials used to make common objects (Resources 6c).

Adopted Instructional Materials and Other Resources: *Sample Campus Environmental Audit* (CIWMB publication #560-05-010).

Summary Description

- Teacher facilitates a class discussion on what happens to those materials/objects/resources that are used at school once they are “used up.” Students will share their prior knowledge and assess their level of awareness of the school’s waste management system.

- Students audit the school's waste stream.
- Students compile the data they collected in the audit, calculating means, medians, and modes.

Responsible individual(s): Classroom teachers, custodian or facilities manager(s), city or county recycling coordinator, local waste haulers, and parent volunteers.

Timeline: Six class period(s) and a number of homework sessions (depending on which aspects of the audit the teacher selects).

LESSON 4—Analyzing Resource Use Patterns

Standards-Based Learning Objective(s)

Students will:

- Prepare and deliver informative presentations on resource use and waste management on the school campus. (Speaking Applications 2.2).
- Identify different energy and material resources that are provided by natural systems (Resources 6b).
- Classify energy and material resources as renewable, non-renewable or inexhaustible (Resources 6b).
- Identify energy and material resources that are essential to human life (Resources 6b).
- Provide examples of how human practices and rates of consumption can affect the availability of energy and material resources that are essential to human life (Resources 6b).
- Identify the natural origin of the materials used to make common objects (Resources 6c).

Adopted Instructional Materials and Other Resources: Mathematics textbook, English-language arts textbook, data from waste audit, and school budget information. Access to computer lab for creating presentations.

Summary Description

- Students work in their audit groups to construct appropriate graphs, showing comparisons of different types and quantities of resources consumed in different locations on campus.
- Students examine the school-site budget and note the amount of money spent on resources (supplies) and waste management and then calculate the percentage of the school budget that goes to resources (supplies) and waste management.
- Students discuss how resource use and waste management practices relate to the availability of energy and material resources to the larger community.
- Students analyze their findings and create multimedia presentations for various audiences (other classes, site administrators, school board, etc).
- Student groups give oral presentations of their findings, selecting the five most important discoveries made during their studies to share with their audience.

Responsible Individual(s): Classroom teachers, computer lab teacher, school or district accountant, parent organizations, school board members.

Timeline: Five to six class periods and various homework sessions.

LESSON 5—Making Connections to Ancient Civilizations (History-Social Science)

The following activity is designed to connect students' learning experiences in the previous lessons to their understanding of the historical significance of natural resource use—specifically to World History and Geography of Ancient Civilizations content standards 6.1(1) and (2); 6.2(1), 6.3(4), 6.4(1), 6.5(1), 6.6(1), 6.7(3).

Standards-Based Learning Objective(s)

Students will:

- Create maps identifying physical features and natural resources in various parts of the world to explain the historical migration of people, expansion and disintegration of empires, and the growth of economic systems in ancient civilizations (Chronological and Spatial Thinking: 3).

Adopted Instructional Materials and Other Resources: History-social science textbooks, atlases, and blank world maps.

Summary Description

- Students use their textbooks and atlases to “map” the political boundaries of the ancient Mesopotamian, Egyptian, Kush, Greek, Indian, Chinese, and Roman civilizations (around 1000 B.C.). Students are encouraged to place their maps on the wall in correct geographic relation to one another. As each civilization’s settlement, environment, natural resources, and trade goods are examined during subsequent lessons, students add these elements to the maps for reference as their study of ancient civilizations continues throughout the year.

Responsible individual(s): Classroom teachers.

Timeline: One to two class periods.

Identify the Strategies and Considerations for Implementing the Campus Needs Assessment

Assessment Strategy(ies) for Campus Needs Assessment

- **Math (Statistics, Data Analysis and Probability 1.1).** The pre-assessment will be based on the textbook quiz. For the post-assessment, students will take the chapter test from the textbook. Possible extension: students contrast audit data from another source, such as another school campus or a location in the community.
- **Science (Resources 6b).** Pre-assessment data will be gathered from a quiz on natural resources and their classification as renewable, non-renewable, or inexhaustible. Post-assessment data will be gathered through a teacher-created test on material resources. Possible extension: students select a common object and draw a diagram, or concept map, delineating the “life” of the object including harvesting of its raw materials, manufacturing, distributing, and disposing of the object.

Collaborative Instructional Team

Educators and School Staff: _____

Coach: _____

Community Partners: Local waste management company, district office and warehouse personnel, local or State government representatives, such as CIWMB Office of Local Assistance staff.

Additional Support Mechanisms: Parent volunteers, office staff, food service staff.

Teaming Considerations

- Teachers must plan ahead to ensure that student teams have independent blocks of work time to conduct research, interview staff, and complete written work.
- The grade-level teaching team will need to work together to plan times to team-teach certain lessons within the campus needs assessment. Students will rotate between their rooms on different days for certain lessons.
- Teachers will need to work with the administration for a shared preparation time so they can better collaborate on instruction and management.

Sample Timeline for Developing the Campus Needs Assessment

Planning: A week before the beginning of the school year.

Development (preparation): Three days.

Implementation: The first three to six weeks of the school year.

Evaluation: At the conclusion of assessment.

Celebration: One class period prior to Thanksgiving break.